

SUBSTITUTE ABSTRACT

A fabric and tape laying head operable with: (a) a robot including a programmable controller, (b) a supply roll containing a continuous strip of composite tape or fabric, and (c) a mold, plug or mandrel of predetermined surface shape relative to x, y and z coordinates, including:

- a. a chassis movable by the robot for laying the tape or fabric onto the mold along a programmed path that is straight with respect to the x and y coordinates and follows contours of the predetermined surface shape with respect to the z coordinate,
- b. a support for the supply roll on the chassis,
- c. a contact roller module mounted on the chassis downstream from the supply roll and adapted to receive the tape from the supply roll, the contact roller module being carried by the chassis as the chassis is moved along the programmed path,
- d. a tape cutting unit situated between the supply roll and the contact roller module,
- e. feed rollers for driving the tape from the supply roll and maintaining the tape taut while it passes from the supply roll and maintaining the tape taut while it passes through the tape cutting unit, and driving the tape to the contact roller module, the tape extending from the supply roll to the tape-cutting unit having opposite generally parallel side edges,
- f. the tape-cutting unit to cut a predetermined profile along at least one of the opposite sides of the tape as the tape is moving through the tape-cutting unit and/or to cut the tape transversely to have a predetermined length when it covers a predetermined surface area of the mold,
- g. the contact roller module including at least one modular frame, a set of three pressure contact rollers carried by the frame, namely a center roller and two side rollers in end-to-end relationships, the set of pressure contact rollers adapted to have the tape received from the tape-cutting unit pass around the pressure contact rollers and be laid onto the mold, and where each of the side rollers has its central axis angularly displaceable relative to the central axis of the central roller, and

h. a suspension system for dynamically energizing the contact roller module to have its rollers apply a predetermined level of force downward on the tape during the lay-up process regardless of any varying contours on the mold surface.